Problem H: Climbing the Bridge

With great agility, intelligence, and a little bit of luck, Indy and his companions escape from the mines and are ready to go back to the village, but this is not over yet. . .

The temple priest, Mola Ram, is expecting them in a long bridge that they must cross in their way back to the village. Indy decides to cut the ropes that hold the bridge together, breaking it in two.

Figure 1: Indy climbing

Now Indy has to hold on to the planks of the bridge and climb up to safety. He climbs up grabbing each plank in order until he reaches the top. However, the planks are not in perfect shape, and they could break while he is climbing. Indy won't fall if the plank he is grabbing breaks, because he uses the rope to secure himself as well, but he keeps grabbing all remaining planks while he can.

We will assume that there is a fixed probability **p** that a plank is "good" (i.e. it doesn't break when Indy grabs onto it). This probability is the same for all planks, and whatever happens with one plank doesn't affect the others.

Let's call a *chain of good planks* the maximum number of planks that Indy grabs in succession such that none of the planks in the chain break. If there are **N** planks remaining for Indy to climb, what is the expected value for the chain of good planks?

For example, let's say that there are 2 planks remaining, and that p is 0.9. Then, the possible combinations that could happen are:

Outcome	Probability	Chain
GG	0.81	2
GB	0.09	1
BG	0.09	1
BB	0.01	0

Where B represents a "bad" plank and G a "good" plank. Then, the expected value of the chain would be:

$2 \times 0.81 + 1 \times 0.09 + 1 \times 0.09 + 0 \times 0.01 = 1.8$.

Input

Input starts with a positive integer **T**, that denotes the number of test cases ($T \leq 100$).

Each test case contains an integer **N**, the number of planks left to climb, and a floating point number **p**, the probability of any given plank being a "good" one. $1 \le N \le 1000$. $0 \le p \le 1.0$.

The probabilities are presented with exactly two digits after the decimal point.

Output

For each test case, print the case number, and then print the expected value of the chain of good planks, as a floating point number with exactly three digits after the decimal point.

Sample Input

```
2
2 0.90
42 0.75
```

Output for Sample Input

```
Case 1: 1.800
Case 2: 9.764
```